CITY OF LODI

COUNCIL COMMUNICATION

AGENDA TITLE: Plans and Specifications and Advertisement for Bids for Standby Generators for Water Well and Storm Drain Pumping Stations for Sites 7, 9 and 16

MEETING DATE: February 1, 1995

PREPARED BY: Public Works Director

RECOMMENDED ACTION: That the City Council approve amending the plans and specifications for the above project and authorize advertising for bids.

BACKGROUND INFORMATION: The City's Water Master Plan recommends that reliable backup power be available at a minimum of one-third of the well sites. We currently have twenty-four wells and six standby generators. The existing generators are mostly 1940's and '50's government surplus units that were last overhauled in the 1960's. They are obsolete, and repair and replacement parts are no longer readily available. The controls are unreliable and cannot be considered "automatic" as they should be. Only four out of the six generators are operational and they all do not automatically start and operate properly. The four locations are Wells 5, 8, 9 and 16. Well 9 is currently out of service[1]. Another unit at Well 7 has not functioned for many years and has been cannibalized for parts. The sixth unit is at Well 13 and has electrical problems. If we are to maintain reliable standby power capabilities, these units need to be replaced.

The sites recommended for immediate replacement are those having adjacent storm pump stations for which the generators will be sized to handle both the well and the storm pumps. These are three of the City's four major pump stations - Beckman Park (Well 16), Shady Acres (Well 9) and Lodi Lake (Well 7). The old generators were sized to only run the well or some of the storm pumps.

This project, with two additional sites, was approved for bidding last year. The specifications included an option for a lease/purchase arrangement due to the poor financial condition of the water utility. The project was bid twice and both times all bids were rejected due to various problems with the bids and questions about the project in general.

Staff is again recommending that we move forward on this project and offers the following project justification and changes in project scope and funding for Council consideration:

Justification

State regulations require that the water system maintain a minimum pressure in the system under various conditions. In Lodi's system, this is done by two means. The first and foremost is

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[1] Well 9 has had intermittent problems with bacteria counts exceeding State standards. Based on some preliminary work, we feel the problem can be solved with an on-site disinfection unit (not chlorine). Since this well is free of DBCP, it is too valuable to simply abandon the site. Staff will be making a recommendation on how to proceed with this well at some time in the future.

APPROVED: _____
THOMAS A. PETERSON
City Manager

recycled paper

the various well pumps that lift groundwater and pressurize the system. Pumps are turned on and off to meet customer demands and maintain system pressure. Secondarily, our single elevated water tank can provide water and pressure under certain hydraulic conditions.

If all the pumps were to stop, the tank would supply water only for a short period of time depending on the demand. The question of how much standby capacity is needed becomes more of a risk management issue than a straightforward engineering calculation.

In discussions with Electric Utility staff, it appears the most likely, and also the most severe, power outage that would affect the water system is a citywide outage. (Smaller area outages would affect far fewer wells and, unless they occurred during a peak time, would not cause a major problem. Also, having generators on some wells spread throughout the City would help to minimize this problem.) Over the past eleven years, we have averaged one citywide outage per year. They ranged in duration from 4 minutes to 58 minutes. If we were to analyze this similar to storm events and express it in terms a 100-year event, we would design for an outage duration of 72 minutes (see **Exhibit A**).

If the water tank were called upon to be the sole source of supply, the length of time it would last would depend on the customer demand and the amount of water in storage at the start of the power outage. **Exhibit B** presents this analysis under various demand conditions assuming the tank starts half full with 50,000 gallons. Under present average day conditions, the tank would last just over 5 minutes.

One difficulty in further analyzing this problem is that under power-outage conditions, water demand tends to drop off. The exact amount is unknown and would vary considerably with the nature of the demand. For example, demands for industrial processes and automatic irrigation systems would probably drop. Typical domestic uses would be less affected.

Given all these difficulties in analyzing the problem, common practice in the industry is to provide some level of backup protection, hence the recommendation from our previous engineering consultants to provide standby power at one-third of our wells.

Additional justification for the three recommended sites is that this will also provide standby power for the adjacent storm pump stations. We have not analyzed power outages at these individual locations, but it certainly would seem prudent to provide backup power for critical flood control facilities.

Project Scope and Funding

As noted, last year's project was for five sites. Based on the Water Master Plan, we should have eight wells with standby power. We recommend that the City:

- keep the units at Wells 5 and 8 on-line for a few more years, cannibalizing parts from the other units as needed. Unneeded parts and/or units would be included in the bid to be removed;
- purchase the three units listed above, bringing the total to five. Since we have budgeted lease payments for two years, we have enough funds available to cover the purchase price without resorting to a lease and corresponding interest payments;

- pay for 50 percent of the cost of these three units that will serve the storm pump stations from the Storm Drain Fund. A recommendation as to the actual amount of funds to appropriate would be made at the time of award;
- plan to purchase three additional units in two years and another three units in four years and take the obsolete units at Wells 5 and 8 out of service. This will result in a total of nine new units, which, by that time, will represent one-third of our wells.

This recommended project is substantially different from last year's project and should attract many bidders. The specifications for the recommended units will be extracted from the previous specifications and appropriate changes made to the bid documents to account for the other changes in the project. The bid opening date will be set by the Public Works Director after the changes are made and the plans and specifications are ready for bidding.

FUNDING:	Originally Budgeted:	1993/94
	Budgeted Fund:	Water Capital Outlay
	Current Appropriation:	$384,000
	Total Project Estimate:	$350,000

Jack L. Ronsko
Public Works Director

Prepared by Richard C. Prima, Jr., City Engineer

JLR/RCP/lm

attachments

cc: Purchasing Officer
Water/Wastewater Superintendent
Street Superintendent
City Engineer

Exhibit A

City-Wide Power Outage Analysis

Date Range: January 1984 thru December 1994 n = 11.0 years

Date	Duration (minutes)	Time
3/10/85	14	12:46 PM
3/2/86	54	12:37 PM
4/8/86	10	9:02 AM
10/21/86	58	10:55 PM
7/16/88	13	2:33 PM
7/6/89	49	12:19 AM
7/29/89	10	6:21 PM
2/16/90	17	1:25 PM
4/16/90	17	1:33 AM
4/4/91	4	8:44 AM
8/24/92	18	3:27 AM

Number of outages:	11	
Total Duration:	264	minutes
Average Duration μ:	24	minutes
Median Duration:	17	minutes
Standard Deviation σ:	18.7	minutes

Confidence level	z	Outage duration ($\mu+z\,\sigma$)
90%	1.645	55 minutes
95%	1.960	61
98%	2.326	67
99%	2.576	72

Confidence level assumes normal distribution of outage durations.

z per "Basic Statistical Methods for Engineers & Scientists" 2nd Ed. 1976, page 159, Table 10-2.

Exhibit B

Water System Demand & Storage Tank Capacity

Tank Capacity:	100,000	gallons (full)
Available Storage:	50,000	gallons (assumed)
Avg. Flow Available for 60 minutes:	833	gpm

Demand year:	1993	2007
Avg. Day, gpm:	9,000	15,000
Max Day, gpm:	17,000	34,000
Peak Hour, gpm:	25,000	50,000

Flow Time from Available Storage

year:	1993	2007
Avg. Day, minutes:	5.6	3.3
Max Day, minutes:	2.9	1.5
Peak Hour, minutes:	2.0	1.0